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ABSTRACT

The purpose of this study was to either confirm or refute the claim of the producer of the Time-Life Video Tape Speed Reading system that improved speed would be independent of the time interval between the eight individual taped lessons. The English department at the Southern Technical Institute (Georgia) offered a speed reading course in three different modes with different intervals between lessons. Data were gathered on preccurse and postcourse reading speed. The analysis of variance indicated no statistical justification for rejecting the null hypothesis, and the producer's claim was substantiated. (MKM)

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THE EFFECT OF MODE OF INSTRUCTION ON LEARNING IN A VIDEO TAPE SPEED READING SYSTEM

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INTRODUCTION

Reading has come a long way since, in Sheridan's The Rivals, Sir Anthony Absolute said to Mrs. Malaprop, "Had I a thousand daughters, by Heaven! I'd as soon have them taught the black art as their alphabet." In Socrates' or Plato's day, all one had to do to be a learned man was to have read everything ever written (probably less than the equivalent of twenty books). Even as recently as a century ago, it would not have been difficult to find an expert who had read every book or article ever written on a particular subject. Today, however, it would take a lifetime to read just the books and articles written on a particular subject in one year. The Library of Congress currently catalogs over 70 million items, including more than 17 million books and pamphlets (11:663). Last year there were 62,471 periodicals published in the U. S. and Canada, and that number is currently increasing at the rate of over 1,100 per year (10:Preface). The 1976 edition of The Education Index, which catalogs only 186 of the 62,471 periodicals published last year, lists over 687 articles on just the subject of reading alone. These figures do not even include newspapers or unpublished reports. Obviously, reading is an indispensable and integral part of every modern education, and rapid reading is essential for every professional or

college student who hopes to keep abreast of the current literature in his field of endeavor.

In the spring of 1976, the English Department at the Southern Technical Institute purchased the Time-Life Video Tape Speed Reading System and initiated a two-credit hour elective speed reading course during the summer quarter of 1977. The course was offered in three instructional modes. The first offering was one hour per week for eight consecutive weeks. The second alternative was two hours per week for four weeks, followed by four weeks of vocabulary building. The third choice was four weeks of vocabulary building followed by two hours per week for four weeks of speed reading. Data concerning the pre-course and post-course reading speed was collected by the English Department for each student in the program.

According to the producers of the video speed reading system, student performance, as measured by percentage increase in reading speed, is independent of the pacing or frequency of scheduling the eight one-hour lessons. The producer's claim eludes to but is not substantiated by statistical evidence. It was the purpose of this practicum to statistically test the hypothesis that the increase in reading speed was independent of the mode (frequency) of instruction. This research was specifically requested by

the Head of the English Department in order to either confirm or refute the producers' claim and identify an optimum mode of instruction to be used in future speed reading courses at the Southern Technical Institute.

Since this research concerned a variable which has significant effect on the rate of learning, the topic falls under the realm of learning theory and is appropriate for that module of the NOVA University Ed. D. Program.

A review of the literature revealed not only how important rapid reading skills are but how programs like the one recently initiated at the Southern Technical Institute foster the development of such skills.

Dr. George Spache, former Head of the Reading Laboratory and Clinic at the University of Florida, reports in his book, Faster Reading for Business:

> The average American businessman or businesswoman spends approximately fifteen to twenty hours a week reading technical reports, correspondence, trade journals, and the like. Studies of the reading skills of adults shows that many are handling their materials about as efficiently as an elementary school child. (9:1)

A rather antiquated article by Bursk in the Harvard Business Review points out that as a result of their slow reading speed, most of the reading done by businessmen is confined to management subjects and practical books. The article reported that more than half of the young executives

enrolled in advance management courses at Harvard read virtually no books except textbooks and business reports. (2:330-345) Spache and Berg amplify Bursk's findings:

> What is true of businessmen is even more true of other segments of the population. Active reading is carried on only by about 25 or 30 percent of the population. Only about 10 percent use a library as often as once a month. Three-fourths of all the books borrowed from libraries are read by less than 5 percent of the population.

In the face of such evidence, the need for improved reading skills is clearly established. The Time-Life Video Speed Reading System purports to develop that skill. The system which was developed by Dr. Edward Fry, Director of the Reading Center at Rutgers University and President of the National Reading Conference, consists of eight lessons, each on a separate video cassette. Each lesson takes about forty minutes to complete, with time divided between video instruction and reading reinforcement. (12:114) Dr. Wayne Otto, Chairman of the Department of Curriculum and Instruction at the University of Wisconsin, conducted a study of the Time-Life Video Speed Reading System, and although his report does not include the statistical evidence upon which his findings are based, he claims that, "At the end of the course, the average businessman more than doubled his reading speed--an average increase of 121%." (8:5)

Robert Gagne points out, " . . . an important advantage of the video-based instruction such as the tape cassette is that consistency and quality of instruction can be achieved and maintained." (3:280) This is, of course, important since quality learning is facilitated by quality instruction. Ralph Gerry in his work, The Psychology of Learning, further attests to the value of the video tape media and set the stage for the research conducted in this practicum.

> The research available on film and television, by now quite extensive, indicates that both are as effective in informational and skill learning as conventional teaching methods--the major task ahead is to learn how instructional devices can be most effectively incorporated into the education process. (4:96-97)

PROCEDURES

As stated previously, the Time-Life Video Tape Speed Reading System was offered in three modes during the summer of 1977:

Mode I — One hour of speed reading instruction per week for eight consecutive weeks.

Mode II — Two hours of speed reading instruction per week, followed by two hours per week of vocabulary exercises.

Mode III — Two hours per week of vocabulary exercises followed by two hours per week of speed reading instruction.

A total of 50 students participated in the program, 36 of whom studied under Mode I, six under Mode II, and eight under Mode III. Participation was on a voluntary basis with elective credit being awarded. It was therefore not possible to control the assignment of students to any particular mode. However, since the students were not aware of the mode of instruction which they would receive until after each had selected his class (the only difference being the time of day the class was offered), it was not unreasonable to assume that each mode received a random sample of the population of students participating in the study.

Data was collected by the English Department on the pre-course and post-course reading speeds of each participant. The form used is shown in Appendix A. To preserve the integrity of the research, however, the data was not reviewed or analyzed prior to the statement of the hypothesis and approval of the proposal for this practicum. The percentage increase in reading speed for each participant was then calculated, and a one-way analysis of variance performed to test the hypothesis that there was no difference in reading speeds as a result of the three modes of instruction.

H_o: There is no difference in percent increase (Δ) in reading speed as a result of mode of instruction.

$\Delta_I = \Delta_{II} = \Delta_{III}$

H_A: Not all modes produce the same percent increase in reading speed.

$\Delta_i \neq \Delta_j$

A tabulation of the data and the calculations to arrive at the "F" value for the analysis of variance are shown in Table I.

A basic assumption under the analysis of variance technique is that the population from which the samples are drawn are normally distributed (or at least approximately so). To validate this assumption for the current research, a chi-squared χ^2 test for normality of percent increase in reading speed was performed. A tabulation of data used in calculating χ^2 is shown in Table II. A histogram of the distribution of percentage increase in reading speed is shown in Figure 1. Superimposed on the histogram is a normal distribution with the same mean and standard deviation. This normal distribution was obtained from values defined in the χ^2 calculations.

TABLE I

ONE-WAY ANALYSIS OF VARIANCE CALCULATIONS

	MODE I (4 sections)				MODE II	MODE III	
Percentage Increase in Reading Speed by Mode of Instruction	66	150	117	277	180	150	
	169	96	75	171	277	100	
	242	90	120	92	155	80	
	70	56	108	127	90	40	
	92	236	114	125	177	129	
	93	330	24	88	236	57	
	120	108	198	122		357	
	130		273	220		100	
			57	110			
			71	42			
			122				
$T_{.j} = \sum_{i=1}^{n_j} X_{ij}$	4701				1115	1013	$T_{..} = 6829$
n_j	36				6	8	$N = 50$
$\bar{X}_{.j} = \frac{T_{.j}}{n_j}$	130.583				185.83	126.63	$\bar{X}_{..} = 136.58$

Total Sum of Squares (SST) $= \sum_{j=1}^{k} \sum_{i=1}^{n_j} (X_{ij} - \bar{X}_{..})^2 = 284,356.18$

Among Groups Sum of Squares (SSA) $= \sum_{j=1}^{k} n_j (\bar{X}_{.j} - \bar{X}_{..})^2 = 16,642.72$

Error Sum of Squares (SSE) = SST - SSA = 267,716.46

(See Appendix B for definition of symbols.)

TABLE II

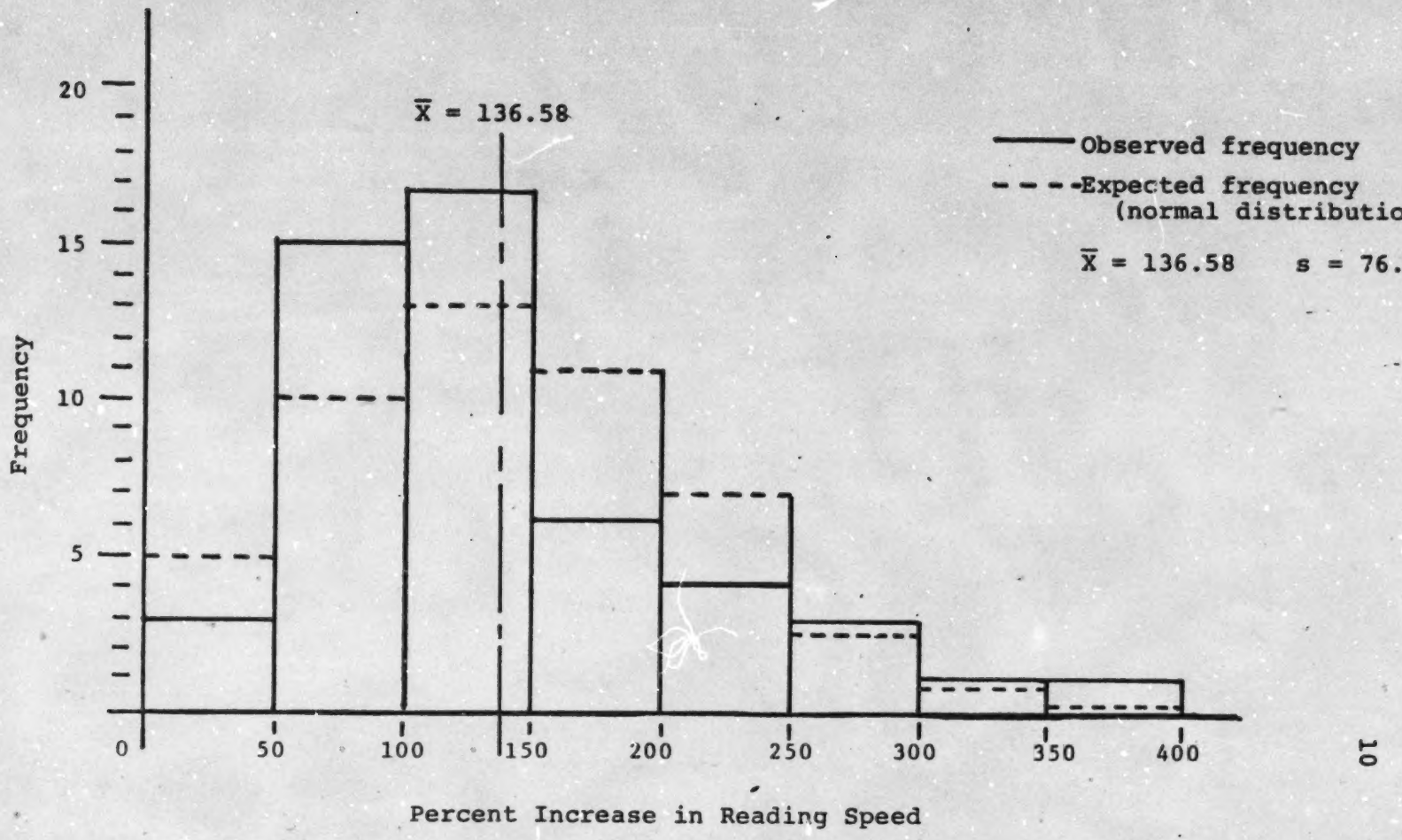
CALCULATIONS OF CHI-SQUARE

$\bar{X}$ = 136.58 s = 76.18

RANGE	FREQUENCY	o		e	$\frac{(o-e)^2}{e}$	
0-50	111	3	(4.57)	5	.80	
50-100	𝍸 𝍸 𝍸	15	(9.38)	10	2.50	$\nu = 8 - 3 = 5$
100-150	𝍸 𝍸 𝍸 11	17	(12.72)	13	1.23	$\chi^2_{.05} = 11.1$
150-200	𝍸 1	6	(11.37)	11	2.27	
200-250	1111	4	(6.72)	7	1.29	
250-300	111	3	(2.62)			
300-350	1	1 } 5	(.67) }	4	.25	
350-400	1	1	(.14)			
		$\sum$ 50		$\sum$ 50		$\chi^2_{cal} = 8.34$

FIGURE 1

OBSERVED AND EXPECTED (NORMAL) DISTRIBUTION
OF PERCENTAGE INCREASE IN READING SPEED



RESULTS

The results of the analysis of variance calculations are summarized in Table III.

TABLE III

SUMMARY OF ANALYSIS OF VARIANCE CALCULATIONS

Source	Sum of Square	df	Mean Square	
Total	284,356.18	49		
SSA	16,642.72	2	8321.36	$F_{cal} = \frac{MSA}{MSE} = 1.46$
SSE	267,713.46	47	5696.03	$F_{(1-\alpha)} = 3.2$

When the calculated value of $F_{cal} = 1.46$ is compared with a tabulated 95% confidence critical value of $F_{95\%} = 3.2$, there is no statistical justification for rejecting the null hypothesis that percent increases in reading speed are the same. It may, therefore, be concluded that the percent increase in reading speed is independent of the mode of instruction.

Calculations for the χ^2 test are shown in Table II. These calculations yield a $\chi^2_{cal} = 8.34$ which when compared to the 95% confidence value of $\chi^2_{95\%} = 11.1$ provides strong statistical evidence that the population from which the

sample data was taken has an increase in reading speed which is normally distributed.

DISCUSSION

The significant difference between the calculated and tabulated "F" values in the analysis of variance lends considerable strength to the null hypothesis. The results of this study when combined with the claims of the producer of the video tape system and the results of Dr. Otto's study (8:5) lead to the almost irrefutable conclusion that, although there may be some individual difference in increase in reading speed which might be attributed to the mode of instruction, the mean percentage increases of the three studied groups did not differ significantly.

As pointed out by Kamala Anandam, the NOVA University reader, in his comments on the proposal for this practicum: "It is hard to pass judgment on the modes without considering which students perform better in which mode." It would have been very interesting and informative to have scheduled students into the various modes using a stratified random sampling process. If each sample had included a cross-section of students, as characterized by verbal SAT score or some other measure of previous reading ability, the effect of mode of instruction on the different entrance levels

could have been studied using a two-way or Latin square analysis of variance. Unfortunately however, registration was completed, the course taught, and data collected before the inception of even the proposal for this practicum. Students were permitted to register in a random fashion to suit their own personal scheduling preferences. Since in order to insure honest responses the students were not required to provide their names on the questionnaire, there was no way that the students' SAT scores or other pertinent data could be obtained after the fact. Almost certainly, however, some individual students will perform better under one mode of instruction than under another. It is recommended, therefore, that any future research into the effect of mode of instruction on increase in reading speed incorporate appropriate stratified random sampling techniques to facilitate a more complete analysis.

The proposal for this practicum stated that the Duncan multiple-range test would be applied if the analysis of variance indicated a significant difference in the effect of mode of instruction. Since the null hypothesis was not rejected, however, the Duncan test was not appropriate. It was recognized, however, that for the conclusions drawn from the analysis of variance test to be valid, the population from which the samples were drawn had to be, at least

approximately, normally distributed. Although the proposal did not establish a procedure for verifying that normality, it was felt that such verification was important. A χ^2 test for normality was conducted as described in the procedures section of this report. The results, as reported in the previous section, reveal a strong tendency toward the normal distribution. This correlation is depicted graphically in Figure 1 and adds considerable credibility to the results of the analysis of variance study.

IMPLICATIONS AND RECOMMENDATIONS

The implications of the results of this study are clear. It is immaterial which mode of instruction is used, and the English Department may feel free to schedule the video tape speed reading course in the mode which is most convenient to the Department and meets the personal desires of the students. This reduction in scheduling restrictions should insure that competent faculty are available and that the students will approach the course with a more positive and cooperative attitude. All of these factors are important in learning theory and, as pointed out in the literature, should be optimized for maximum learning.

Since the purpose of the Time-Life Video Tape Speed Reading Course is to improve both reading speed and

comprehension and since the form used for collection of the data used in this analysis also gathered data on pre-course and post-course comprehension, it is recommended that further statistical analysis be performed to assess the effect of mode of instruction on comprehension. It would not be unreasonable to assume that as reading speed increases comprehension might decrease under Mode I (no vocabulary augmentation) but that comprehension might be positively correlated with reading speed in Modes II and III. Either a two-way analysis of variance or a correlation analysis might reveal significant information on the value of the various modes of instruction. As stated in the discussion section of this report, however, any new research which involves establishing new test groups and gathering new data should incorporate stratified sampling to gain further insight into the interaction of student ability with mode of instruction.

BIBLIOGRAPHY

1. Alder, Henry L., and Edward B. Roessler. Introduction to Probability and Statistics. San Francisco: W. H. Freeman and Company, 1972.

2. Bursk, E. C., and D. T. Clark. "Reading Habits of Business Executives," Harvard Business Review, XXVII (May, 1949).

3. Gagne, Robert M. The Conditions of Learning. New York: Holt Rinehart, Inc., 1964.

4. Garry, Ralph. The Psychology of Learning. New York: Center for Applied Research in Education, 1963.

5. Kramer, Clyde Y. "Extension of Multiple Range Tests of Group Means With Unequal Numbers of Replications," Biometrics, Vol. 12 (September, 1956).

6. Maylouse, Hewitt (ed.) Education Index, July 1975 to June 1976. New York: H. W. Wilson Company, 1976.

7. Mednick, Sarnoffa. Learning. Englewood: Prentice Hall, Inc, 1964.

8. Otto, Wayne. "A Study of the Time-Life Video Speed Reading System." University of Wisconsin, 1974. (mimeographed).

9. Spache, George, and Paul Berg. Faster Reading for Business. New York: Thomas Crowell Company, 1958.

10. Standard Periodical Directory. Fifth Edition, 1977. New York: Oxbridge Communications, 1977.

11. The New World Almanac, 1977. New York: Newspaper Enterprises Association, Inc., 1977.

12. Time-Life Multimedia 1976/1977 Video Catalog. Paramus, New Jersey: Time-Life Films, Inc., 1976.

APPENDIX A RAPID READING QUESTIONNAIRE

R^2 SURVEY

Starting speed_____words per minute, Comprehension, _____%

Present speed_____words per minute, Comprehension, _____%

Scanning speed_____words per minute, Comprehension, _____%

I did all the homework as directed. ▱

I did most of the homework as directed. ▱

I practice my rapid reading skills whenever I read. ▱

APPENDIX B

DEFINITIONS OF SYMBOLS USED

Analysis of Variance Calculations

X_{ij}	The i^{th} observation in the j^{th} mode
T_{ij}	Total of sample observations in j^{th} mode
$\bar{X}_{.j}$	Mean of sample observations in j^{th} mode
$T_{..}$	Total of all sample observations
n_j	Number of sample observations in j^{th} mode
n	Total number of sample observations
SST	Total sum of squares
SSA	Among mode sum of squares
SSE	Error sum of squares
df	Degrees of freedom
MSA	Among group mean square
MSE	Error mean square
F	Variance ratio
α	Level of significance
$1-\alpha$	Level of confidence
h	Number of modes (3)

Chi-Squared Calculations

χ^2	Chi-square
O_i	Observed frequency in i^{th} category
E_i	Expected frequency in i^{th} category

α	Level of significance
$1-\alpha$	Confidence level
k	Number of categories or classes

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